This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Currently Amended): A method for modeling a semiconductor device comprising the steps of :

(a) modeling the semiconductor device with a semiphysical model at a predetermined temperature; and

(b) ~~modeling~~ incorporating the thermal properties of the material system of the semiconductor device ~~with an analytical thermal~~ into the semiphysical model to form a temperature dependent semiphysical model ~~;and~~

~~(c) coupling the semi-physical model and said analytical model~~.

Claim 2 (Original). The method as recited in claim 1, further including step (d) determining the internal charge/electric field structure of the semiconductor device.

Claim 3 (Original). The method as recited in claim 1, wherein said semi-physical model is configured to replicate measured direct current (DC) current-voltage (I-V) characteristics.

Claim 4 (Original). The method as recited in claim 3, wherein said semi-physical model is also configured to replicate bias dependent small signal characteristics.

Claim 5 (Original). The method as recited in claim 4, wherein said semi-physical model is configured to replicate said DC I-V and bias dependent.

Claim 6 (Original). The method as recited in claim 1, wherein step (b) includes the step (e): measuring the DC-IV characteristics and the S-parameter small signal parameters across a predetermined range of temperatures.

Claim 7 (Original). The method as recited in claim 6, further including the step (f): extracting small signal equivalent circuit models for each S-parameter measurement as a function of temperature.

Claim 8 (Original). The method as recited in claim 7, further including step (g): developing temperature co-efficient which adjust the semi-physical device model to match the measured DC and S-parameter measurements at each temperature.

Claim 9 (Original). The method as recited in claim 1, wherein step (c) includes step (h): substituting the environment temperature that operates in any temperature dependent terms and temperature co-efficient with the channel temperature of the device.

Claim 10 (Original). The method as recited in claim 1, wherein step (c) further includes step (i): using of the saturated region as the length of the heat generating region.

Claim 11 (New) The method as recited in claim 1, wherein step (b) comprises: developing temperature co-efficient expressions and adjusting the predictions of the semiphysical model to match the measured DC and small signal data at a plurality of temperatures.